Active Project (2014 - 2017)

Advanced Energy Storage Systems (AESS) Project

Game Changing Development Program | Space Technology Mission Directorate (STMD)

ANTICIPATED BENEFITS

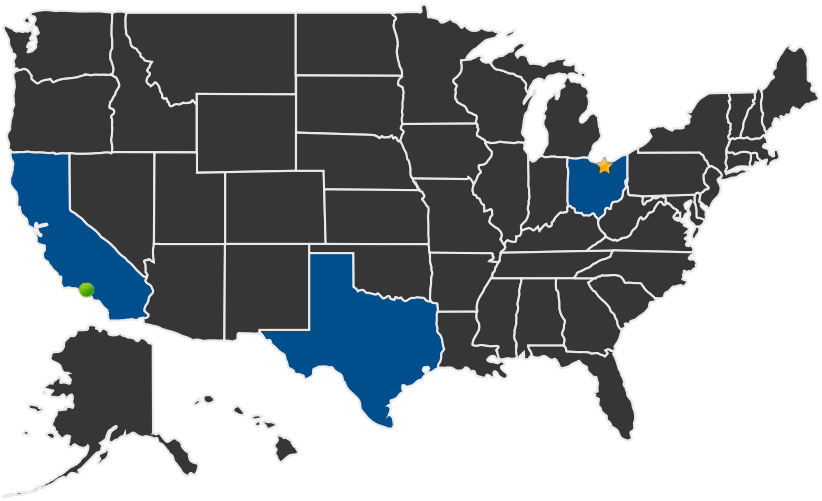
To NASA funded missions:

Light weight, compact portable life support systems Lighter, more compact energy storage systems Power through eclipse periods

DETAILED DESCRIPTION

Develop and demonstrate Advanced Energy Storage System (AESS) technologies that meet NASA's space exploration needs for safe, abundant, reliable, and lightweight energy storage through the development of high specific energy storage systems such as compact, lightweight battery packs and through the development of very high specific energy devices with specific energies beyond that possible with Li-ion chemistries.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Glenn Research Center

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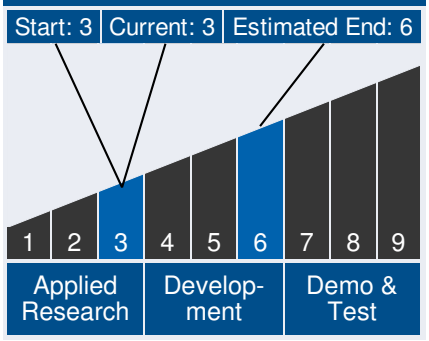
Technology Maturity



Management Team

Program Executive:
- Lanetra Tate

Program Manager:
- Mary Wusk

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Supporting Centers:

- Jet Propulsion Laboratory

Other Organizations Performing Work:

- Amprius, Inc.
- Indiana University -- Purdue University Indianapolis
- University of Maryland (College Park, MD)
- University of Maryland, College Park

Management Team *(cont.)*

Project Manager:

- Donald Palac

Principal Investigator:

- Charles Taylor

Technology Areas

Primary Technology Area:
Space Power and Energy Storage (TA 3)
└ Power Generation (TA 3.1)
  └ Solar (TA 3.1.3)
    └ 250 kWe-class Solar Array Structures (TA 3.1.3.2)
└ Energy Storage (TA 3.2)
  └ Batteries (TA 3.2.1)
    └ High-Specific-Energy, Human-Rated Lithium (Li) Secondary Batteries (TA 3.2.1.1)

Secondary Technology Area:
Space Power and Energy Storage (TA 3)
└ Energy Storage (TA 3.2)
  └ Batteries (TA 3.2.1)

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Technology Areas *(cont.)*

Additional Technology Areas:

Space Power and Energy Storage (TA 3)
- Power Generation (TA 3.1)
  - Solar (TA 3.1.3)
    - MWe-class Solar Array Structures (TA 3.1.3.3)
- Energy Storage (TA 3.2)
  - Batteries (TA 3.2.1)
    - High-Specific-Energy, Human-Rated Lithium (Li) Secondary Batteries (TA 3.2.1.1)
    - Long-Life Lithium (Li)-Ion Secondary Batteries (TA 3.2.1.2)
    - Long-Life Lithium (Li)-Ion Secondary Batteries (TA 3.2.1.2)
    - Very Low-Temperature Secondary Lithium (Li)-Ion Batteries (TA 3.2.1.3)
    - Very Low-Temperature Secondary Lithium (Li)-Ion Batteries (TA 3.2.1.3)
    - High-Temperature Primary Batteries (TA 3.2.1.6)
    - High-Temperature Primary Batteries (TA 3.2.1.6)
  - Flywheels (TA 3.2.2)
    - Large Energy Storage Flywheels (TA 3.2.2.1)
    - Large Energy Storage Flywheels (TA 3.2.2.1)
    - High Specific Energy, High Temperature Flywheels (TA 3.2.2.2)
    - High Specific Energy,

DETAILS FOR TECHNOLOGY 1

Technology Title

Advanced Energy Storage Systems

Technology Description

This technology is categorized as a hardware component or part for transportation applications

The high specific energy battery system prototypes will include high energy Li-ion battery cells integrated into a compact and lightweight battery pack. The very high specific energy devices will focus on the development of novel and innovative devices beyond Li-ion battery cells and may include non-electrochemical devices.

Capabilities Provided

- > 250 Wh/kg at the battery pack level
- > 400 Wh/kg at the cell level
- Life cycle > 100 cycle
- Safe operation

Potential Applications

- EVA advanced space suit
- Landers
- Rovers
- Space craft